

IN THE CLAIMS

Upon entry of the present amendment, the status of the claims will be as is shown below. This listing of claims replaces all previous versions and listings of claims in the present application.

Claims 1-13 (Cancelled)

14. (New) A bending apparatus having a ram start-up device for starting a ram comprising at least one of an upper table to which a punch is attached and a lower table to which a die is attached, the bending apparatus bending with the punch and the die a workpiece abutted against abutments of a back gauge so as to be positioned, the bending apparatus comprising:

a ram start-up device configured to be movable in a lateral direction; and

a controller configured to stabilize positioning and processing operations of the workpiece by selecting edges of a workpiece to be abutted against the abutments, based on a shape of the workpiece at each bending sequence, and configured to move the ram start-up device to a point in front of positioning points of the abutments corresponding to points of the selected edges.

15. (New) The bending apparatus according to claim 14,

wherein the point in front of positioning points of the abutments corresponding to points of the selected edges is an intermediate point in the lateral direction between positions of the abutments.

16. (New) The bending apparatus according to claim 14,

wherein the ram start-up device comprises one of a foot switch and a two-hand operating device.

17. (New) The bending apparatus of claim 16, in which a transfer mechanism of the ram start-up device comprises a guiding mechanism and a driving mechanism,

wherein the guiding mechanism comprising a guide disposed in the lateral direction and a roller rotatably disposed on a side of the ram start-up device and slidably attached to the guide, and the driving mechanism comprising a driving pulley and an idler pulley disposed on both ends of the guide and a timing belt toroidally disposed around both the pulleys and fixed on the side of the ram start-up device.

18. (New) A bending apparatus having a ram start-up device for starting a ram comprising at least one of an upper table to which a punch is attached and a lower table to which a die is attached, the bending apparatus bending with the punch and the die a workpiece abutted against abutments of a back gauge so as to be positioned, the bending apparatus comprising:

a ram start-up device configured to be movable in the lateral direction;

a foreign object detector that detects entry of a foreign object into a region of movement of the ram start-up device; and

a controller that prevents the ram start-up device from moving when the entry of the foreign object is detected.

19. (New) The bending apparatus according to claim 18,

wherein the foreign object detector comprises a light emitter and a light receiving element, and when a ray of light from the light emitter is blocked, the entry of the foreign object is detected.

20. (New) The bending apparatus according to claim 18,

wherein the ram start-up device comprises one of a foot switch and a two-hand operating device.

21. (New) The bending apparatus of claim 20, in which a transfer mechanism of the ram start-up device comprises a guiding mechanism and a driving mechanism,

wherein the guiding mechanism comprising a guide disposed in the lateral direction and a roller rotatably disposed on the side of the ram start-up device and slidably attached to the guide, and the driving mechanism comprising a driving pulley and an idler pulley disposed on both ends of the guide and a timing belt toroidally disposed around both the pulleys and fixed on the side of the ram start-up device.

22. (New) A bending apparatus having a ram start-up device for starting a ram comprising at least one of an upper table to which a punch is attached and a lower table to which a die is attached, the bending apparatus bending with the punch and the die a workpiece abutted against abutments of a back gauge so as to be positioned, the bending apparatus comprising:

the ram start-up device configured to be movable in the lateral direction;
an input part that inputs product information;

a bending sequence determiner that determines a bending sequence of the workpiece based on the product information;

a tool determiner that determines the punch and the die bending the workpiece and tool layout at each bending sequence;

an abutment point determiner that determines a point of an abutment in the lateral direction based on the bending sequence, the tool and the tool layout; and

a ram start-up device point determiner that pre-determines a point of the ram start-up device in the lateral direction within a range of an abutting width procured from at least one abutment based on the determined point of the abutment in the lateral direction, and that when the ram start-up device actually moves to a point different from the pre-determined point, determines the actual moving point as a final point of the ram start-up device.

23. (New) The bending apparatus according to claim 22,

wherein the ram start-up device point determiner determines a substantially intermediate point of an abutting width procured from at least one abutment as the point of the ram start-up device in the lateral direction.

24. (New) The bending apparatus according to claim 23,

wherein the ram start-up device comprises one of a foot switch and a two-hand controller.

25. (New) The bending apparatus according to claim 24,

wherein the final position of the ram start-up device is saved in a controller when an ON signal is output from the ram start-up device.

26. (New) The bending apparatus according to claim 22,

wherein the ram start-up device comprises one of a foot switch and a two-hand controller.

27. (New) The bending apparatus according to claim 26,

wherein the final position of the ram start-up device is saved in a controller when an ON signal is output from the ram start-up device.

28. (New) The bending apparatus according to claim 22,

wherein the final position of the ram start-up device is saved in a controller when an ON signal is output from the ram start-up device.

29. (New) A bending apparatus having a ram start-up device for starting a ram comprising at least one of an upper table to which a punch is attached and a lower table to which a die is attached, the bending apparatus bending with the punch and the die a workpiece abutted against abutments of a back gauge so as to be positioned, the bending apparatus comprising:

the ram start-up device configured to be movable in the lateral direction;

an abutment point determiner that determines a point of an abutment in the lateral direction based on bending sequence, tool and tool layout decided by a worker according to product information; and

a ram start-up device point determiner that determines a point where the ram start-up device is actually positioned as a point of the ram start-up device in the right-left direction within

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a range of an abutting width procured from at least one abutment based on the point of the abutment in the right-left direction.

30. (New) The bending apparatus of claim 29,

wherein the ram start-up device point determiner determines the actual positioning point as the point of the ram start-up device in the lateral direction, and then saves the determined point in a controller.